only, but is possessed in common by both. Its origin, therefore, may not be traceable directly to "sexual selection;" still it may be that an attractive peculiarity in one sex has subsequently been adopted as equally attractive by the other, and hence the habit of nibbling their tail-feathers universally practised by both sexes alike. Anyhow we seem in this instance to be brought into nearer view of the origin of this peculiar feature than is attainable in most other instances of the kind; and we also see certainly a method by which similar racket-shaped tail-feathers, originating in the voluntary act of the bird and fostered by sexual selection, might be produced in one sex or both in a permanent form. In other birds, such as *Steganura*, *Loddigesia*, and *Discura*, amongst Humming-birds, similar features prevail, and also in such cases as *Prioniturus* amongst Parrots, and *Tanysiptera* amongst Kingfishers; but in both of these last, as in the Motmots, the character is common to both sexes.

Referring to *Steganura*, we have a specimen of *S. underwoodi* showing that the rhachis of the tail-feathers (in this case the lateral ones) is clean from the first. Here the process of nibbling the webs may have been carried on till the character has become natural by the gradual weakening of the development of the webs attacked until they were finally eliminated. In *Steganura cissura*, however, the lateral feathers are simply narrowed. This may have arisen from the abandonment of the habit by this particular species after it commenced segregation from the primitive stock of *Steganura*, that stock, as in *Momotus*, not having then acquired the racket tail-feathers in a permanent form.

Whether the same cause has produced the racket-shaped tails in *Prioniturus* and *Tanysiptera* is more difficult to trace, as it would appear that in these birds the rhachis becomes more and more denuded in each successive moult, showing other causes at work. On the origin of such highly complicated structures as the tails and other features of some of the Paradiseidæ the present supposition throws no light.

May 6, 1873.

Prof. Newton, F.R.S., V.P., in the Chair.

The Secretary read the following report on the additions to the Society's Menagerie during the months of March and April 1873:—

The total number of registered additions to the Society's Menagerie during the month of March 1873 was 68, of which 5 were by birth, 16 by presentation, 41 by purchase, 1 by exchange, and 5 were received on deposit. The total number of departures during the same period by death and removals was 85.

The most noticeable additions during the month of March were as follows:—

1. A second specimen of the Western Ground-Parrakeet of Australia (*Geopsittacus occidentalis*, Gould, Suppl. B. of Austr.

pl. 66). The first specimen of this scarce species was presented by Dr. F. Müller in November 1867 (see P. Z. S. 1867, p. 891).

The present example, which was purchased of a dealer on March 16, is the third known specimen of this nocturnal Parrot, which was originally described by Mr. Gould, in 1861, from a mutilated skin.

2. A short-toed Eagle (*Circaëtus brachydactylus*) from Saffi, Morocco, presented by Capt. P. Perry, March 18th.

This is a well-known South-European bird of prey, but has not been represented in our series for many years, I believe.

The total number of registered additions to the Society's Menagerie during April 1873 was 146, of which 23 were by birth, 42 by presentation, 64 by purchase, 2 by exchange, and 15 were received on deposit. The total number of departures during the same period by death and removals was 72.

The most noticeable additions were as follows:—

1. A Broad-banded Armadillo (*Xenurus unicinctus*), obtained by purchase on the 8th of April.

This fine species of Armadillo is quite new to the Society's collection.

2. A pair of White-necked Cranes (*Grus leucauchen*, Temm.), obtained by purchase April 17th, and stated to have been received from Japan.

So far as I am aware, this fine Crane has never been previously brought alive to England; but several of the continental Societies possess examples of it.

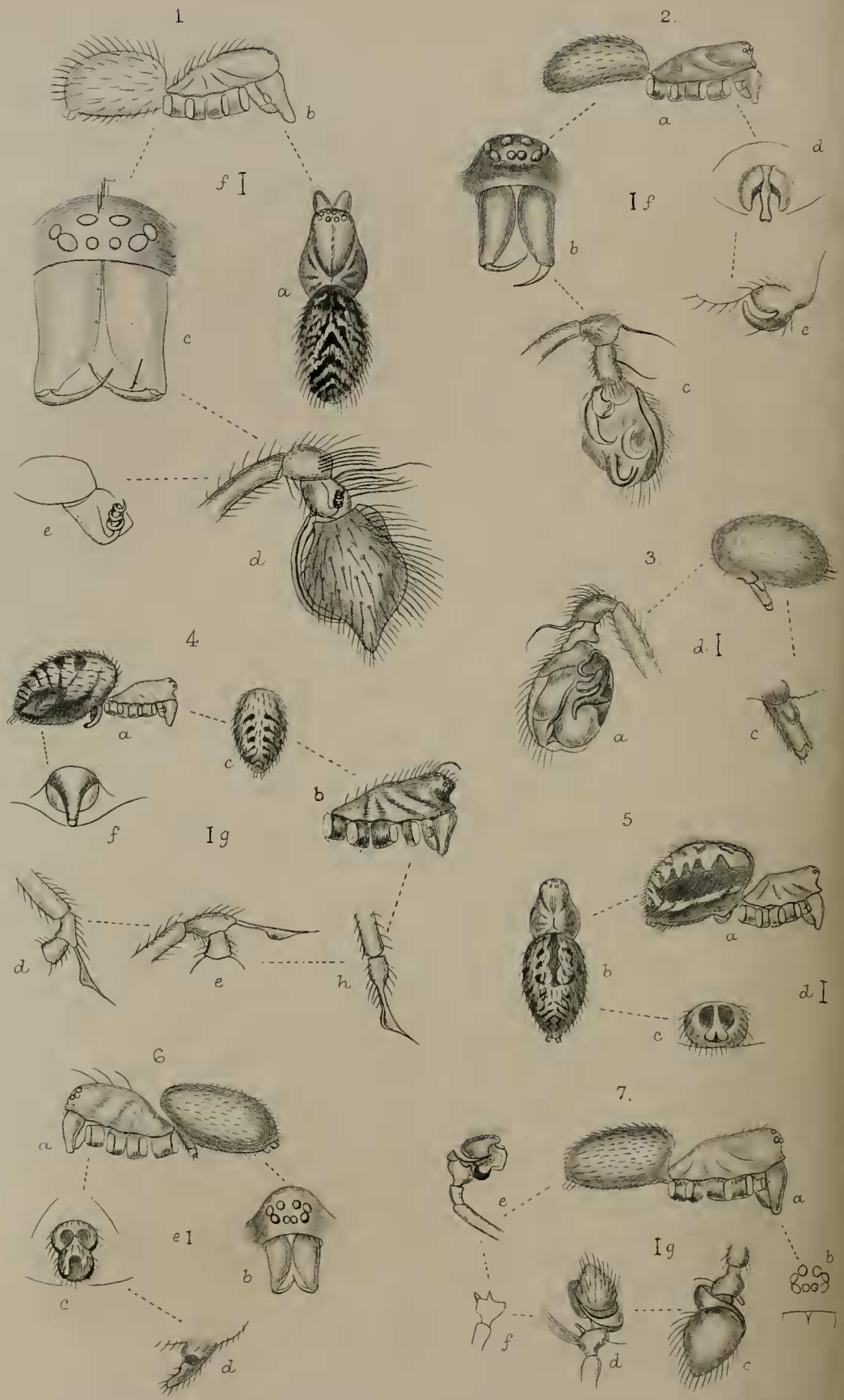
3. In a collection of small Passerine birds, obtained from the Jardin d'Acclimatation of Paris on the 25th of April, were single specimens of two interesting Japanese Buntings, neither of which has ever previously occurred to me in a living state. These are the Yellow-browed Bunting (*Emberiza chrysophrys*, Pall.) and the Red-backed Bunting (*Euspiza rutila*, Pall.).

4. An example of Oersted's Squirrel Monkey (*Saimaris œrstedi*), brought from Panama by one of our correspondents of the West-Indian Mail Company, and purchased April 29th.

In my recent paper on the Central-American Quadrumana (P. Z. S. 1872, p. 3) I recorded this species as *S. entomophaga*, D'Orb. Prof. Reinhardt has since described and figured it as *Chrysothrix œrstedi* (Vid. Medd. 1872, p. 157, pl. 3), considering it, I have little doubt quite correctly, distinct from the Bolivian *S. entomophaga*.

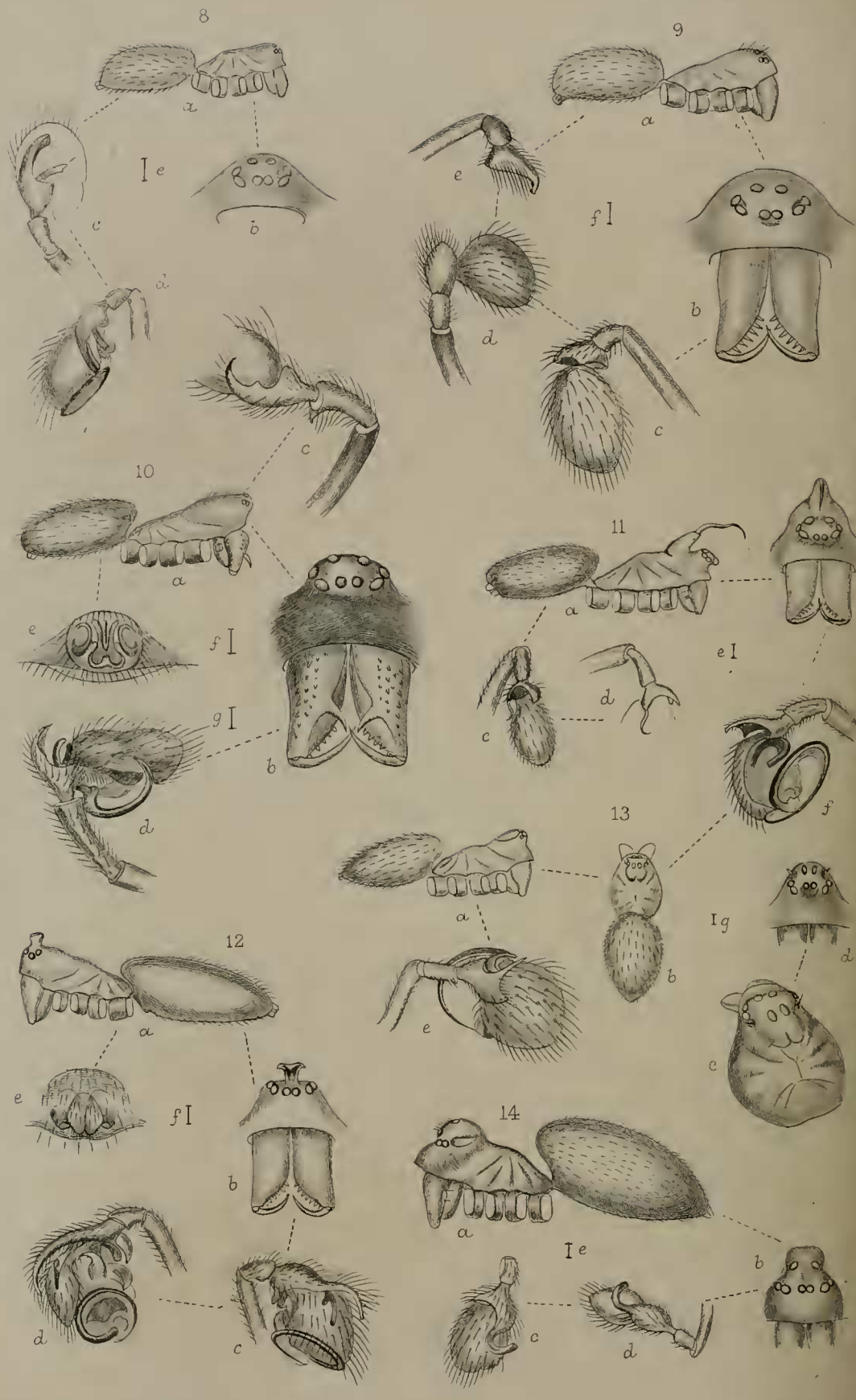
Mr. Sclater called attention to the fact of a young Liberian Hippopotamus (*Hippopotamus liberiensis*) having been recently brought alive to this country, and gave some details respecting this specimen, which had been obtained by Mr. John S. Price, of the Colonial Office, from some negroes who had brought it from the Little Scarcies River to Sierra Leone, and presented to Mr. Pope Hennessy. Mr. Hennessy had given it to the Royal Zoological Society of Ireland; but it had died shortly after reaching Dublin.

Mr. Sclater exhibited some photographs of this animal taken in Liverpool.



O. P. Cambridge del. A. T. Hollick lith. W. West & C° imp

New Spiders from Siberia.



O.P. Cambridge del. A.T. Hollick lith.

W. West & Co. imp.

New Spiders from Siberia

The following papers were read :—

1. On some New Species of Araneidea, chiefly from Oriental Siberia. By the Rev. O. P. Cambridge, M.A., C.M.Z.S.

[Received March 15, 1873.]

(Plates XL. & XLI.)

In May 1872 a small collection of minute Spiders, collected by Dr. Dybowski in the neighbourhood of Kuttuk on the southern point of Lake Baikal in Oriental Siberia, was kindly sent me by Mons. Taczanowski, of the Zoological Museum at Warsaw. This collection was accompanied by two others—one made by M. Taczanowski near Warsaw, the other by Dr. Karpinski at Kiew, in Ukrania. The two last collections number between forty and fifty species, chiefly of the genera *Linyphia* and *Erigone* (the latter equivalent to *Neriene* and *Walckenaera*, Blackw.) ; but, although some of these species are of great interest, I can detect but one novelty among them (*Erigone sollers*, posteà, p. 443, Plate XLI. fig. 8) ; the rest belong to species already recorded in Northern and Western Europe.

In the Siberian collection, however, out of eighteen determinable species thirteen appear to be undescribed :—one of the family *Agelenides*, genus *Lethia* (Menge); the rest of the family *Theridiides*, four being of the genus *Linyphia* and eight of the genus *Erigone*. A point of special interest in regard to these new species is their being so exceedingly closely allied to forms already described from northern and western Europe, and yet so curiously and decidedly distinct ; while, at the same time, the collection contained neither of the species to which they are thus (severally) so nearly allied. Not knowing what may have been the range or extent of the search of which this Siberian collection is the result, nor the season at which it was made, it is impossible to speak with certainty as to the richness of the locality in respect of these minute Spiders ; but the sample now under consideration leads me to believe that the part of Siberia in question would yield numerous additional and still more interesting forms when carefully searched. Another point of interest with respect to this collection is, that the locality where it was made (Baikal) is the easternmost point at which, as far as I am aware, any species of *Erigone* has yet been found.

Sketches of critical portions of the structure of the Spiders described in the present paper have been added to the descriptions (see Plate XL.) in the hope of making it easier to compare and distinguish other closely allied species.

Fam. Agelenides.

Genus Lethia.

Lethia taczanowskii, sp. n. (Plate XL. fig. 1.)

Adult male, length $1\frac{1}{2}$ line.

The *cephalothorax* is of ordinary form ; the lateral constrictions

at the caput are slight; but the normal furrows and indentations are well marked, and its colour is a pale dull yellowish; the margins, as well as a central longitudinal line and the two converging lines which mark the form of the caput are black; the central longitudinal line has some long bristly hairs directed forwards.

The *eyes* are on black spots, arranged in two transverse rows; looked at from the front the fore one is nearly straight, and the hinder one the largest and much curved; those of the hinder row are nearly equidistant from each other, and about equal in size; those of each lateral pair are near together, but not contiguous to each other, obliquely placed, and the fore one is the largest of the eight; those of the fore central pair are the smallest and rather further from each other than each is from the fore lateral on its side.

The *legs* are moderately long and strong; their relative length is 1, 4, 2, 3? those of the fourth and second pairs differ but very little, and it was difficult to ascertain which was the longest; they are of a pale yellow colour, faintly but broadly banded with dusky brown, and are furnished with hairs and long, strongish bristles; and each tarsus terminates with three claws.

The *palpi* are moderately long, rather strong, and of a pale yellowish colour; the cubital and radial joints are short, but of about equal length; the former is rather gibbous in front, where it has some black bristles closely grouped together at the fore part; the radial joint has a black, spiral or corkscrew, spiny apophysis springing vertically from the outer side of its fore extremity, and some strong black bristles on the inner side; the digital joint is large, broad-oval, very convex on its outer side, where it is furnished pretty thickly with bristly hairs, and pointed at its fore extremity; the palpal organs are well developed but simple, and appeared to be encircled by a strong corneous process or spine-like fillet.

The *falces* are moderately strong, long, and rather projecting and divergent at their extremities; they did not appear to be armed with any teeth on their inner surface; and their colour is similar to that of the cephalothorax.

The *maxillæ* are strong, straight, broader at their extremity (where they are obliquely truncated on the outer side) than at the base, and rather darker in colour than the falces.

The *labium* is of an oblong form, rather rounded at the apex, and about half the length of the maxillæ, to which it is similar in colour, though perhaps rather more suffused with dusky blackish.

Sternum heart-shaped, furnished with hairs and bristles, and of a yellowish-brown colour.

The *abdomen* is oval, bluntish at both ends, tolerably convex above, and projecting but slightly over the base of the cephalothorax; it is spotted, mottled, and marked thickly with black-brown and a warm brownish yellow, showing besides some parallel and slightly oblique lateral lines of spots, a rather large and tolerably conspicuous triangle on the centre of the upperside bounded by a pale brownish-yellow line, and followed towards the spinners by some similarly coloured pale angular lines or chevrons. The upper-

side is furnished with long, strongish, bristly hairs; and the underside of the abdomen is of a dull yellowish hue, suffused more or less with dusky blackish; the spinners have a supernumerary one (or united pair) in front of the usual six.

The female resembles the male in colours and markings, and has calamistra on the outer side of the metatarsi of the fourth pair of legs.

This Spider is nearly allied to *L. puta* (Cambr.), but may be at once distinguished by the cubital joint of the male palpus being merely gibbous, and not prominently pointed at its fore extremity as in that species, and in the less size of the spiral spine at the outer extremity of the radial joint. The present is also a more distinctly marked and more largely blotched-looking Spider, and of a darker or richer colour; the pale triangle on the upperside of the abdomen, as well as the larger size of the spiral spine at the outer extremity of the radial joint of the male palpus, and the greater development of its free extremity, seem also to be good specific differential characters.

An adult male and an immature female were contained in the Siberian collection received from M. Taczanowski, with whose name I have much pleasure in connecting it.

Fam. Theridiides.

Gen. Linyphia.

Linyphia karpinskii, sp. n. (Plate XL. fig. 2.)

Adult male, length 1 line.

The whole of the fore part of this Spider (including the legs and palpi) is of a pale orange-yellow colour; the colour of the abdomen is of a duller hue, in some examples suffused with a sooty brown. It is nearly allied to *L. angulipalpis* (Westr.), both in form and colour, but may be distinguished by its less size and paler colour, as well as by the form of the cubital joint of the male palpus; in *L. angulipalpis* this joint has the middle of the fore side of an angular and almost sharply prominent form, while in the present species it is prominent but far more obtuse. The palpal organs also differ in their structure.

The *legs* are furnished with a few hairs and some long spines; they are rather long and moderately strong, their relative length being 4, 1, 2, 3.

The *maxillæ* are curved and inclined towards the labium; and the height of the clypeus, which is impressed below the eyes and prominent at its lower margin, exceeds half that of the facial space. The prominent portion of the cubital joint of the palpus (male) terminates with a tolerably strong, slightly bent, black, tapering bristle; and there is another less strong one issuing from the fore side of the radial joint; both joints are furnished with a few other hairs. The palpal organs are well developed and complex, consisting of several curved and other corneous spines and processes.

The female of this species is easily distinguished from that of *L.*

angulipalpis by the form and structure of the sexual aperture, which in *L. karpinskii* is more prominent and has a long, strongish, curved epigyne, which arches over from the fore to the hinder part; this epigyne is of a pale, semidiaphanous, whitish colour, and is dilated in the middle; in other respects the female resembles the male.

Both sexes of this Spider in the adult state were contained in the Siberian collection received from M. Taczanowski.

Linyphia dybowskii, sp. n. (Plate XL. fig. 3.)

Male adult, length $1\frac{1}{4}$ line.

This interesting *Linyphia* is closely allied to the foregoing and also to *L. angulipalpis* (Westr.), which it resembles, both in general form, structure, and colour; it is, however, larger and deeper-coloured than *L. karpinskii*, and may be distinguished without difficulty from both species by the structure of the palpi and palpal organs. In *L. karpinskii* the cubital joint of the palpus is in fact five-sided when looked at in profile, but in the present it is four-sided; the profile of the upperside, instead of presenting a somewhat angular, as in *L. karpinskii*, and a strongly angular gibbosity as in *L. angulipalpis*, consists of an evenly curved or arched line, from the fore extremity of which, where it forms with the lower side a strong prominence, there springs a strong, tapering, black spine, of a strongly curved, and, in fact, of a sickle form, handle and all being represented. The radial joint is very short, much constricted at its junction with the cubital, and a little produced in front. The palpal organs are well developed and complex, consisting of bolder corneous processes than those of *L. karpinskii*. The figures given of the palpal organs of this species and *L. dybowskii*, although generally accurate, must not be relied upon for exceeding accuracy of detail; such minute accuracy, however desirable, could not be obtained under the difficulties under which the figures were drawn. The female of *L. dybowskii* may be easily distinguished from that of both the other species named by the strikingly different form of the process connected with the sexual aperture. A comparison of the sketches given of that portion of structure of the present species and *L. karpinskii* will show this at a glance.

Both sexes of this species, in the adult state, were contained in M. Taczanowski's Siberian collection, made by Dr. Dybowski, whose name I have taken the liberty to confer upon this interesting Spider.

Linyphia unicornis, sp. n. (Plate XL. fig. 4.)

Adult male, length 1 line.

This very distinct and remarkable species has the whole of the fore part (including the legs and palpi, but excepting the sternum) of a clear yellow colour, the sternum being strongly suffused with sooty brown; the abdomen is of a pale straw-yellow hue, with two longitudinal rows of brown-black blotches on the upperside, converging towards the spinners, and continued in lateral lines or short

stripes into a large, irregular, brown-black patch on the lower parts of the sides. Some little variety exists in the size of the blotches and stripes and extent of the lateral patch; and in the male they are all less strongly marked, and of less extent, than in the female. The blotches on the upperside only reach to about one third of the length from the fore margin of the abdomen; the underside is of a suffused sooty-brown hue. There is nothing unusual in the general form and structure. The eyes are on strong and sometimes nearly confluent black spots; those of the hind central pair are further from each other than each is from the hind lateral on its side; but a striking and distinguishing character of the male consists of a strong, curved, horn-like, semidiaphanous, pointed spine, which rises from immediately behind the hind central eyes and arches forwards over the ocular area.

The *palpi* have the radial and cubital joints short, but of about equal length; the latter is prominent, in a somewhat angular form at its fore extremity on the upperside; and from that prominence issues a long and strong spine-like bristle, dilated on the inner side, rather more than halfway towards its fine point, into a largish, flat, semicircular dilatation; this spine-like bristle is more than double the length of the joint itself, and is slightly bent, and with an outward direction. The digital joint is large; and the palpal organs are well developed, prominent, and complex, with dark red-brown corneous processes and spines.

The *legs* are long, moderately strong; their relative length appeared to be 1, 4, 2, 3; but it was impossible to decide this with accuracy, owing to the contorted state of the legs, which it was impracticable to expand without fracture; they are furnished with hairs and spines. The process connected with the sexual apperture of the female is characteristic in form and prominent.

Both sexes (adult) of this species were contained in the Siberian collection received from M. Taczanowski. It is allied to *L. angulipalpis* (Westr.) in the angular form of the cubital joint of the male palpus, but, perhaps, more nearly to *L. minuta* (Bl.), departing from the *angulipalpis* group by having on the abdomen a distinct pattern nearly approaching in its character to the ordinary *Linyphia* type; but the peculiar curved horn-like spine on the caput, and the unusual strength and form of the spiny bristle at the fore extremity of the cubital joint of the palpus, will serve to distinguish it at a glance from any other recorded species known to me.

LINYPHIA TACZANOWSKII, sp. n. (Plate XL. fig. 5.)

Adult female, length $1\frac{1}{2}$ line (nearly).

The *cephalothorax* of this Spider is of a darkish obscure yellow-brown, the normal grooves and indentations, as well as the margins and the longitudinal central line, being suffused and indicated by darker brown. The *falces*, *maxillæ*, and *labium* are of a similar colour to the cephalothorax, the sternum being black-brown; all these portions of structure are of the usual type, and appear to need no special detail. The height of the clypeus is about equal to half

that of the facial space; it is strongly impressed immediately below the eyes, and prominent at its lower margin.

The *eyes* are in the ordinary position and not greatly unequal in size. All are seated on tolerably strong tubercles; those of the lateral and fore central pairs being the strongest; the eyes of the hinder row are about equidistant from each other; those of each lateral pair are very nearly contiguous to each other, the fore laterals being the largest of the eight. There is a slight interval (of less than half an eye's diameter) between those of the fore central pair, which are the smallest of the eight, though larger than in most species of *Linyphia*.

The *legs* are long, pretty strong; their relative length appeared to be 1, 4, 2, 3; and they are furnished with hairs and rather long and strong spines. The *palpi* are, like the legs, of a clear bright yellow colour, and furnished with hairs and spine-like bristles.

The *abdomen* is oval, of about the ordinary convexity above, and projects considerably over the base of the cephalothorax; its ground-colour is pale yellow, more or less covered with small, irregular, white, cretaceous spots and markings; and the following pattern in black is also visible—a central longitudinal marking on the fore half of the upperside, strongly hollowed or indented on the sides, and two longitudinal rows of irregular spots, rather converging towards the spinners; the posterior pairs of these spots bear traces of being (what no doubt they are) the dilated extremities of the ordinary angular lines or chevrons with which the hinder portion of the abdomen in so many spiders is marked; in the present, as in many other species, the apices of these angular lines are obsolete. The sides of the abdomen are occupied by a long black patch, strongly dentated on its upper margin, and its lower and hinder margin bounded by a broken whitish-yellow line or bar formed by that portion of the ground-colour. The underside and a clear portion round the spinners are of a uniform, somewhat vinous, yellow-brown. The sexual aperture is prominent, and furnished with a longish, curved, longitudinal process, which (looked at with the Spider on its back) is considerably dilated at its hinder extremity.

Two adult females and an immature male were contained in M. Taczanowski's Siberian collection of Micro-araneæ; they seem to me to be very distinct from any species yet known, and to be (in colour and markings) nearly allied to *Linyphia* (*Neriene*, Bl.) *variegata* (Bl.), but greatly exceeding that species in size. The future discovery of the male in an adult state will probably show some strong structural characters in the palpi and palpal organs by which to differentiate that sex from the males of other nearly allied species.

Genus Erigone (*Neriene*, Bl., ad partem + *Walckenaera*, Bl.).

Erigone (Neriene, Bl.) flavescens, sp. n. (Plate XL. fig. 6.)

Adult male $\frac{3}{4}$ of a line; adult female slightly longer.

The whole of the fore part of this small Spider is of a pale but clear and brightish yellow colour, the abdomen being paler and more

or less (though for the most part slightly) suffused with a dusky greenish sooty hue.

In form and structure the cephalothorax is of the ordinary type; the clypeus is equal to half that of the facial space; and the cephalothorax has several long bristly hairs in a longitudinal series along the central line of the upperside.

The *eyes* are of moderate size, closely grouped together, and seated on almost confluent black spots; those of the hind central pair are further from each other than each is from the hind lateral on its side, the interval being near about an eye's diameter; those of each lateral pair are contiguous to each other, and placed obliquely on a slight tubercle; those of the fore central pair are the smallest of the eight, contiguous to each other, and each is separated by no more than half an eye's diameter from the fore lateral on its side. The interval between each of the fore centrals and the hind central nearest to it is rather less than the diameter of the latter.

The *legs* are short and slender; their relative length 1, 4, 2, 3, the difference between 1 and 4 being very slight, if any. They are furnished sparingly with hairs and a few slender, mostly erect, spine-like bristles.

The *palpi* are short. The radial and cubital joints about equal in length, but very short; the former a little produced in front at its fore extremity, but with no marked prominence or apophysis. The digital joint is small, oval; and the palpal organs are well developed and complex, with various corneous processes, and a small and short but conspicuous, prominent, pointed, curved, black spine near their extremity on the outer side.

The *abdomen* is oval, moderately convex above; when in spirit of wine (but probably not before immersion) there are visible various pale lines and spots, forming a regular pattern on its upper part and sides, similar in this to many other species of *Erigone*.

The female resembles the male in general structure and colours. The epigyne connected with the sexual aperture is (like that of many other Spiders) prominent and of a peculiar and distinctive form; in the prominence of this part this species shows a near approach to the genus *Linyphia*. It is closely allied to *L. decens* (Cambr.), but may easily be distinguished by the larger size and closer grouping of the eyes, as well as by its clearer and brighter colours and the armature of the legs. From *L. oblita* (Cambr.), again, it may be distinguished by similar differences in the same characters. Both sexes in the adult state were received from M. Taczanowski in the Siberian collection.

ERIGONE (NERIENE) PROLATA, sp. n. (Plate XL. fig. 7.)

Adult male, length 1 line.

In general structure and form this Spider is of the ordinary type, and much resembles in those respects many allied species on the borders of the genus *Linyphia*. The whole of the fore part is of a yellowish-brown colour, that of the cephalothorax and sternum being rather darker than that of the legs. The normal grooves and indenta-

tions and the margins of the cephalothorax are marked by dusky converging lines. The abdomen is oval, moderately convex above, of a blackish-brown colour, thinly dotted with fine hairs, and, when in spirit of wine, seems to be covered thickly with minute yellowish-brown freckles or dots, and several transverse angular lines or chevrons in the central longitudinal line of the hinder part of the upperside.

The *eyes* are on black spots, closely grouped, but in the ordinary position. The interval between those of the hind central pair is much greater than that between each and the hind lateral nearest to it, and equal to nearly an eye's diameter; those of the foremost row appeared to be as nearly as possible equidistant from, and, in fact, almost contiguous to, each other; those of the fore central pair are, as usual, the smallest of the eight, the fore laterals being apparently the largest.

The *legs* are moderate in length and strength, their relative length being 1, 4, 2, 3; they are furnished with hairs and a few slender spine-like bristles, one near the centre of the upperside of the tibiæ of the fourth pair being stronger than the rest and decidedly a spine. This shows the difficulty of accepting the character of the armature of the legs as a generic one, the present species combining (in this respect) the characters of both *Linyphia* and *Erigone*.

The *palpi* are short. The radial joint is not much longer though stronger than the cubital; it spreads out nearly all round at its fore extremity, where it has a small thorn-like apophysis on the upperside, and another small, but rather stronger and more obtuse one somewhere on its outer side. There are a few bristly hairs in a group towards the outer part of the upperside of the radial joint, and a single one towards the inner side. The digital joint is small. The palpal organs are prominent, highly developed, and moderately complex: a strong corneous process curves up from their base on the inner side, round and over between the base of the digital and fore extremity of the radial joints, and, tapering as it goes, terminates in a point at the middle of the outer side of the digital joint; the position and direction of this process is very peculiar and unlike any thing that I remember to have yet observed in the great diversity of structure presented in the palpal organs of different Spiders of this and other allied groups. Another process of these organs in the present species forms a large, roundish, corneous lobe, which projects considerably beneath on the outer side, and has a small, black, pointed, spine-like projection near its extremity.

The *maxillæ* are short, strong, and considerably inclined towards the *labium*, which last is of the usual, somewhat semicircular form; but it is strongly impressed in a transverse direction below its apex, giving this part the appearance, when looked at sideways, of curling back over towards the base: this is a peculiarity in the form of the labium which I have noticed in some other species, including the last described, *E. flavescens*; and perhaps it will eventually be found to be a good and useful character for the subdivision of this now large group of obscure little Spiders.

A single adult male was contained in M. Taczanowski's Siberian collection.

Erigone (Neriene) sollers, sp. n. (Plate XLI. fig. 8.)

Adult male, length 1½ line.

In the somewhat cylindric elongate general form of this Spider there is great similarity to *E. fugax* (Cambr.); it also resembles that species in the richness of the orange yellow-red colour of the legs, and the deep glossy yellow-brown cephalothorax; this part is of an elongate-oval form, but very slightly impressed laterally forwards, and rather flattened, or much less convex above than many other species; the sides appeared under a lens to be finely rugulose or striated, the caput being perfectly smooth; the height of the clypeus equals half that of the facial space.

The *eyes* are in the ordinary position, not very large or greatly unequal in size; those of the hinder row are about equally separated from each other; those of the fore central pair are contiguous to each other, and equal in size to those of the hind central pair; the fore laterals being rather the largest of the eight.

The *legs* are tolerably strong, not very long; their relative length is 4, 1, 2, 3; they are of a rich reddish orange-yellow colour, furnished thickly with strongish hairs and a few fine short erect bristles.

The *palpi* are short. The radial joint is rather shorter and much stronger than the cubital; its fore extremity on the upperside is produced into a long, strongish, tapering, curved apophysis with a truncated extremity, which is directed outwards; from within the curvature of this apophysis, and apparently springing from underneath the joint, is another slightly curved apophysis. The radial joint is also rather obtusely prominent at its fore extremity on the other side, and more pointedly so behind. The digital joint is large; and the palpal organs are well developed, rather complex, and towards their extremity on the outer side is a strongish, black, filiform, tapering spine, coiled in a circular form.

The *sternum* is convex, very glossy, and of a deep yellow-brown colour, furnished with a few fine bristly hairs.

The *abdomen* is elongate-oval, hairy, and of a greenish black-brown colour, with four slightly impressed dots in a quadrangle about the middle of the upperside; and, besides numerous yellowish points over its surface, several transverse angular lines are visible (when in spirit of wine) on the hinder half of the upperside; the spinners and plates of the spiracles are yellow.

A single adult male of this very distinct species was contained in M. Taczanowski's collection, found by himself at Kiew, in Poland.

Erigone (Neriene) intercepta, sp. n. (Plate XLI. fig. 9.)

Adult male, length 1½ line.

The *cephalothorax* is very glossy and of a dark yellow-brown colour; looked at from above, and rather behind, it is of a regular oval form, rather broadest behind, and without lateral constriction

on the margins forwards; it is on the whole rather flat; but the caput is convex and rounded above, on the sides, and at the occiput, the profile line from that part to the lower margin of the clypeus forming a regular arc of a circle; there are a few hairs grouped among and chiefly immediately behind the eyes; and the height of the clypeus is half that of the facial space.

The *eyes* are small and differ but little in size; they are in the ordinary position, on the fore slope of the arc above mentioned; those of the hind central pair are rather nearer together than each is to the hind lateral on its side; those of each lateral pair are seated obliquely and contiguously to each other on a black tubercle; those of the fore central pair are contiguous to each other, and each is separated by about an eye's diameter from the fore lateral on its side.

The *legs* are moderately long, not very strong, of a bright yellow colour, furnished sparingly with hairs and a few prominent, slender, spine-like bristles.

The *palpi* are rather short, similar in colour to the legs, except the digital and fore part of the radial joints, which are dark brown; the cubital and radial are short, the latter much the strongest, enlarged or spreading at its extremities, and its fore extremity on the upper-side produced into a pointed oval termination, which, looked at in profile, has a hooked appearance; this joint has numerous hairs on its outer side. The digital joint is of moderate size and somewhat oblong form. The palpal organs are well developed and complex, but presenting no very remarkable corneous process; one, however, rather large and of an irregular curved form, is situated at the base on the outer side immediately below the radial joint, and from one of its prominent points issue two or three strongish bristly hairs.

The *falces* are vertical, rather long, moderately strong, of the same colour as the cephalothorax, and covered with tolerably strong sharp teeth towards their extremities on the inner side.

The *maxillæ* and *labium* appeared to be of normal form, and, with the *sternum*, are similar to the falces in colour, the latter, however, having a mottling of black-brown over its surface.

The *abdomen* is oval, moderately convex above, black, thinly clothed with hairs, and not projecting over the base of the cephalothorax. In spirit of wine some pale mottlings and lines are visible.

A single adult male of this Spider was contained in M. Taczanowski's Siberian collection; it seems to approach more nearly to *Walckenaera hardii* (Bl.) (*Leptothrix clavipes*, Menge) than to any other of the genus; it is, however, easily distinguished from that species in the form of the caput.

Erigone (Neriene) taczanowskii, sp. n. (Plate XLI. fig. 10.)

Adult male, length $1\frac{1}{2}$ line; female adult, $1\frac{3}{4}$ line.

Cephalothorax oval, much broadest behind; lateral constrictions on margins scarcely visible, moderately convex above; occiput roundly convex; fore part of the caput rather produced forwards: clypeus retreating and equal in height to nearly two thirds of the facial space; its colour is a dark rich yellow-brown, the normal grooves and inden-

tations marked with a rather darker hue; there are some fine hairs on the upper part of the caput; and the ocular area is slightly tuberculiform by the depression of the surface immediately surrounding and the prominence of the portion on which the eyes of the fore central pair are seated.

The *eyes* are in the ordinary position, and describe a transverse oblong figure, whose transverse diameter is about double its longitudinal diameter; those of the hind central pair are rather depressed or sunken and imbedded, and the interval that separates them is greater than that which separates each from the lateral on its side; those of each lateral pair are seated obliquely and contiguous to each other, the fore one being the largest of the eight; those of the fore central pair are seated on the fore side of a somewhat circular prominence or slight convexity, comprising the greater part of the inside of the ocular area; they are rather the smallest of the eight, near together but not contiguous to each other, and each is separated by about its own diameter's distance from the fore lateral on its side; when looked at from the front the fore central eyes are placed above the straight line formed by the fore laterals.

The *legs* are moderately long and strong; and their relative length appeared to be 4, 1, 2, 3; their colour is yellow; and they are furnished with hairs and a very few slender erect spine-like tapering bristles.

The *palpi* are long, similar in colour to the legs, except the digital joint, which is brown and furnished with hairs. The cubital joint is double the length of the radial, slightly curved, and enlarging towards its fore extremity, which is strongly produced on its outer side, rather beneath, into a prominent angular spur, very similar to that of *E. affinis* (Bl.), *E. graminicola* (Sund.), but less strong and marked than in *E. longipalpis* and its near allies, though approaching to a similar type of structure; about the middle of the margin of the upper extremity is a small red-brown tooth-like prominence. The radial joint is small at its junction with the cubital, but enlarges considerably at its extremity, where on the outer side it is produced into a long and strong curved tapering apophysis, pointed at its extremity, which is directed inwards; the upper and inner margin of this apophysis is nearly black, with a corneous appearance towards the extremity; and at about the middle of its curvature there is a small angular tooth-like prominence. The digital joint is large and of a somewhat oblong-oval form. The palpal organs are prominent, highly developed, but not very complex; a strong black spine issues from a corneous process at their base and curves over to their fore extremity with a bold free sweep; and a large strong corneous process margined with black runs along beneath their outer side. The falces are strong, prominent at their base in front, and excavated on the lower part of their inner sides; their upper surface is furnished with a number of small dark denticulations, mostly towards the outer sides; and a little below the middle of each falx is a large sharp tooth, obliquely directed downwards and inwards, strongly resembling a similar tooth in *E. dentata*, *E. affinis*, and others. The falces are similar in colour to the cephalothorax, as

also are the maxillæ, labium, and sternum, neither of which appeared to present any thing remarkable in form. The abdomen is black, clothed tolerably thickly with palish hairs; it is of an oval form and projects pretty strongly over the base of the cephalothorax; about the middle of the upperside are four strongish pits or circular depressions, forming a quadrangle, whose fore side is the shortest; behind these, towards the spinners, are several transverse, pale, curved lines, indicated by wrinkles or folds in the skin, and forming a longitudinal series corresponding to the angular lines or chevrons so often observed on the same part of the abdomen. The spinners are small and almost concealed by a strong surrounding rim or elevated fold of a semicorneous-looking nature; the spiracular plates are pale yellow.

The female is larger than the male, but resembles it in colours, general structure, and character; but the clypeus is lower. The falces have several dark denticulations on their fore side, but not so many or so strongly developed as the male; they want the strong tooth on the middle of the inner side, but have some smaller sharp ones in the ordinary position towards the extremity on the inner side. The form of the sexual apperture is peculiar, *vide* figure (10 *e*).

Both sexes, adult, were found in the Siberian collection received from M. Taczanowski, with whose name I have great pleasure in connecting this fine and striking species.

Erigone (Neriene) wagæ, sp. n. (Plate XLI. fig. 11.)

Adult male, length 1 line.

This very interesting Spider will be recognized at once as a near ally to *E. apicata* (Bl.), having, like that species, a very characteristic eminence behind the ocular area; in this present instance, however, there will be no difficulty in distinguishing the two species at a glance. The eminence in the present species is much stronger and higher; it is of a somewhat subconical form and is directed forwards; and at its base behind is a strong notch or transverse indentation from its summit, which is obliquely truncated: it is continued by a long, strong, curved, slightly sinuous, tapering spine, apparently composed of two smaller spine-like bristles closely united; in one example the two were separated for a little distance from their extremities. The ocular area is prominent and has a somewhat nose-like prominence below, upon which the fore central eyes are seated; this causes the clypeus to retreat strongly directly below the eyes, but it is a little prominent at its lower margin; the height of the clypeus exceeds half that of the facial space. The colour of the cephalothorax is yellowish brown, margined with black, and the normal grooves and indentations are dusky.

The *eyes* form a transverse and rather obtuse oval figure; they are not very unequal in size; those of the hind central pair are further from each other than each is from the hind lateral on its side; those of each lateral pair are contiguous to each other, and placed slightly obliquely; the fore laterals are the largest of the eight, and each is very nearly contiguous to the fore central on its side, the fore centrals also being not quite contiguous to each other.

The *legs* are long and rather slender; their relative length appears to be 4, 1, 2, 3; they are of a dullish yellow colour, furnished sparingly with hairs, and a very few prominent but short bristles, several of which have a slender spine-like character.

The *palpi* are short, tolerably strong, and similar to the legs in colour. The cubital joint is straight and cylindrical in form; it is three times the length of the radial joint, which is very short, and spreads out prominently but obtusely both in front and on the outer and inner sides; from the extremity on the outer side there issues a rather slender, pale, sinuous, corneous apophysis, and a very small pointed tooth-like projection at the fore extremity. The digital joint is of moderate size and of an oval form, obtusely rounded at its extremity; the palpal organs are well developed and complex, consisting of several corneous spines and processes, but none of a very remarkable character.

The *falces* and *maxillæ* are similar in colour to the cephalothorax. The *labium* is short, rounded at its apex, and transversely impressed across the middle; it is rather darker-coloured than the maxillæ.

The *sternum* is dark blackish brown, of a heart-shape, convex, and very glossy.

The *abdomen* is oval and not very convex above; it is of a dark blackish-brown colour, thinly clothed with hairs, and (visible in spirit of wine) with pale yellowish lines and markings on the upperside and spots arranged in sinuous longitudinal lines on the sides.

This interesting Spider was contained in the Siberian collection received from M. Taczanowski; and I have great pleasure in naming it after Professor Waga, of Warsaw, an eminent entomologist, whose acquaintance I was fortunate enough to make at Assouan, in Upper Egypt, in March 1864.

Erigone (Walckenaera) karpinskii, sp. n. (Plate XLI. fig. 12.)

Adult male, length $1\frac{1}{4}$ line.

This Spider is closely allied to *Erigone cuspidata*, Bl., *E. unicornis* (Cambr.), and *E. kochii* (Cambr.); like them all it has a small vertical eminence rising from the middle of the ocular area. It may be distinguished readily from the first not only by the much greater strength of this eminence, but by its being enlarged and hollowed or notched at its apex. From *E. unicornis* it may be distinguished also by the greater strength of the eminence and the notch being much shallower, as well as by differences presently to be noted of the palpal structure; while in *E. kochii* the eminence, though less proportionally strong, is higher and more distinctly notched than in either of the others, so that the apex has, in fact, two distinct limbs or branches, the extremity of each of which is hollowed out, and the palpal structure is also different from that of the other two species.

The *cephalothorax* is of ordinary form, its profile presenting an almost unbroken slope from its base to the eminence between the

eyes; the hinder part of the base of the eminence is nearer to the hind central than to the fore central pair of eyes, in fact contiguous to them; it is of a rich reddish yellow-brown colour, the margins, normal indentations, and a patch behind the eyes being marked with a dusky but darker hue: the eminence is higher than it is broad at its base; its apex is hollow or with a very shallow longitudinal notch, and its apical margins are slightly folded over outwards.

The *eyes* are nearly of uniform size; they are in four pairs surrounding the eminence; those of the hinder pair are less than an eye's diameter separated from each other and are close to the base of the eminence; those of the foremost pair are nearly, but not quite, contiguous to each other, and seated a very little way in front of its base; those of each lateral pair are contiguous to each other and placed very slightly obliquely; the foremost of each of these lateral pairs is very close to but distinctly separate from the fore central eye nearest to it.

The *legs* are moderate in length and strength; they are orange reddish yellow, furnished with hairs and a few prominent slender bristles; their relative length appeared to be 4, 1, 2, 3.

The *palpi* are not very long, and except the digital joint (including the palpal organs) slender and similar in colour to the legs. The radial joint is stronger than the cubital, and has its fore extremity produced into two apophyses: one from its upperside continues the joint in a long, sinuous, and gradually tapering form, extending to about two thirds of the length of the digital joint; the point of this apophysis is neither dilated, nor cleft, nor acute, but simply obtusely pointed: the other apophysis is on the inner side of the joint and curves round beneath the apophysis already described; it is, however, not quite so long, and has its extremity (which protrudes outwards from under the other) bifid or divided into two limbs, the inferior one of which is longer than the other. The digital joint is large and of a somewhat irregular oval form. The palpal organs are highly developed, prominent, and complex; their main feature consists of a strongish black tapering spine, coiled in a large circle rather beneath on their outer side; in contact with this spine is a considerable quantity of semitransparent whitish membrane. The radial joint, as well as its apophyses, and the digital joint are furnished with longish hairs.

The *falces*, *maxillæ*, *labium*, and *sternum* present nothing remarkable in form or structure; they are of the same colour as the cephalothorax.

The *abdomen* is rather elongate-oval in form, not very convex above, and projects a little way over the base of the cephalothorax; its colour is black, clothed, but not very thickly, with short fine hairs, and (in spirit of wine) showing various minute pale spots and fine lines.

The female resembles the male in general form and characters as well as in colour, but has no eminence between the eyes; the form of the epigyne and sexual aperture is peculiar (see fig. 12 *e*, Plate XLI.).

In regard to the differences between the palpal structure of this and the other species mentioned, *E. unicornis* and *E. kochii*, it will be sufficient here to note that presented by the apophyses of the radial joint: in neither of these species do the two cross each other as in the present case; in *E. unicornis* the extremity of the outer apophysis is dilated and not merely obtuse as in *E. karpinskii*, while the extremity of the inner one is not bifid as in this species; in *E. kochii* the outer apophysis has its extremity not only dilated but strongly bifid, while its inner one is simply obtusely pointed.

Both sexes of this very interesting Spider were contained in the Siberian portion of the collection received from M. Taczanowski; and I have much pleasure in naming it after M. Karpinski, by whom the Kiew portion of the collection was made.

Erigone (Walckenaera) dybowskii, sp. n. (Plate XLI. fig. 13.)

Adult male, length $\frac{3}{4}$ of a line.

The *cephalothorax* of this curious little Spider is short oval in form, and moderately convex above, and its colour is yellow, slightly suffused and marked on the margins and normal grooves and indentations with brown; the caput is slightly raised on the upper part, the raised portion also marked out by a dusky blackish marginal line, indented at the occiput, immediately behind which is a depression. The clypeus exceeds in height half that of the facial space, and is prominent at its lower margin; on either side of the upper part of the caput forwards and immediately behind each lateral pair of eyes is a small roundish pit or indentation, from which issues a small black, slightly curved, prominent, sharp, thorn-like spine; this spine, from its nature and position, is a strong and remarkable specific character.

The *eyes* are tolerably equal in size, and seated on small black spots; they are in four pairs, forming a rather narrow transverse oval figure, each pair being rather widely removed from the others nearest to it; those of the hinder pair appeared to be of an oval form and separated from each other by little, if any, more than half of an eye's diameter; those of the fore central pair are very near but (apparently) not quite contiguous to each other, and their straight line, when looked at from the front, is above that formed by the foremost eyes of the two lateral pairs; the eyes of each of these last pairs are contiguous to each other, and seated rather obliquely on a small tubercle; the figure formed by the eyes of the fore central and hinder pairs is a longish narrow trapezoid, whose length is nearly about double its breadth.

The *legs* are moderately strong, but not very long; they are of a yellowish colour, strongly tinged with reddish yellow-brown, and furnished sparingly with hairs and a few short, erect, black bristles; their relative length appeared to be 4, 1, 2, 3.

The *palpi* are short and of a yellow colour, except the digital joint, which is brownish; the radial is shorter than the cubital joint, and has three apophyses from its extremity—one (a small pointed one) on the outer side, a large broad one on the inner side, and

between them (or perhaps it may be described as forming the outer corner of the inner apophysis) is a longish tapering pointed one, whose extreme point is slightly bent; the digital joint is of tolerable size; and the palpal organs are highly developed but not very complex; from near their extremity on the outer side issues a strongish black, filiform, tapering, sharp-pointed spine, which curving backwards forms a large circle rather behind them and beneath the cubital joint; in connexion with a portion of this spine is some whitish semitransparent membrane.

The *falces*, *maxillæ*, and *labium* are of ordinary form and similar in colour to the cephalothorax, the sternum being suffused with dusky brown.

The *abdomen* is oval, moderately convex above, of a yellowish colour suffused with dusky brown, thinly clothed with short fine hairs, and showing (in spirit of wine) some pale lines and markings.

An adult example of this very distinct little Spider, which reminds one (in its general appearance as well as in some of its special characters) of *Erigone diceros* (Cambr.), was contained in the collection received from M. Taczanowski and made in Siberia by Dr. Dybowski, with whose name I have much pleasure in connecting it.

Erigone (Walckenaera) subrostrata, sp. n. (Plate XLI. fig. 14.)

Adult male, length nearly $\frac{4}{5}$ of a line.

This Spider is very closely allied to *E. picina* (Bl.), which it resembles remarkably in colour, form, and structure; it is, however, rather smaller; the caput is rather less elevated, and the clypeus more prominent, forming at its lower margin a kind of broad bluntish nose-like prominence; the height of the clypeus very slightly exceeds half that of the facial space; and a distinguishing character by which it may be at once separated from *E. picina* is furnished by the radial joint of the male palpus; this instead of being produced at its fore extremity on the upperside into a long tapering *slightly curved* apophysis, has the curved portion more sharply bent into a nearly circular form, with the extreme point (which is blunt) sticking rather prominently upwards; there is also some difference in the structure of the palpal organs; with the exception of the difference above noted the radial joint is remarkably similar to that of *E. picina*, though the curved portion is perhaps in the present species rather less strong and darker-coloured.

These differences, though slight, were constant in six examples compared with a great many of *E. picina*; and I have therefore no hesitation in deciding it to be a distinct, though very nearly allied, species.

The colour of the cephalothorax and other fore parts is a rich, shining brown, that of the legs and palpi yellow, tinged with orange, the abdomen being jet-black.

Adult males were contained in the Siberian collection received from M. Taczanowski.

EXPLANATION OF THE PLATES.

Plate XL.

Fig. 1. *Lcthia taczanowskii* ♂, p. 435.

a, upperside of Spider; *b*, Spider in profile; *c*, fore part of cephalothorax and falces; *d*, right palpus, from outer side in front; *e*, radial and cubital joints of ditto; *f*, natural length of Spider.

2. *Linyphia karpinskii* ♂ & ♀, p. 437.

a, profile of Spider; *b*, fore part of caput and falces; *c*, right palpus (♂). from outer side; *d*, epigyne (♀), from above; *e*, ditto, in profile; *f*, natural length of Spider.

3. *Linyphia dybowskii* ♂ & ♀, p. 438.

a, left palpus (♂), from outer side; *b*, abdomen (♀), in profile; *c*, epigyne (♀), in profile; *d*, natural length of Spider.

4. *Linyphia unicornis* ♂ & ♀, p. 438.

a, profile of Spider (♀); *b*, profile of cephalothorax (♂); *c*, abdomen (♀), from above; *d*, *e*, *h*, portion of left palpus (♂), in different positions; *f*, epigyne (♀), from above; *g*, natural length of Spider.

5. *Linyphia taczanowskii* ♂ & ♀, p. 439.

a, Spider, in profile; *b*, ditto, upperside; *c*, epigyne (♀), from above; *d*, natural length of Spider.

6. *Erigone flavescens* ♀, p. 440.

a, Spider, in profile; *b*, fore part of caput and falces; *c*, epigyne, from above; *d*, ditto, in profile; *e*, natural length of Spider.

7. *Erigone prolata* ♂, p. 441.

a, Spider, in profile; *b*, fore part of caput and falces; *c*, left palpus, from inner side in front; *d*, ditto, from behind; *f*, portion of ditto, from behind; *e*, right palpus, from outer side behind; *g*, natural length of Spider.

Plate XLI.

Fig. 8. *Erigone sollers* ♂, p. 443.

a, Spider, in profile; *b*, fore part of caput and falces; *c*, right palpus, from behind and above; *d*, left ditto, from the front; *e*, natural length of Spider.

9. *Erigone intercepta* ♂, p. 443.

a, Spider, in profile; *b*, fore part of caput and falces; *c*, right palpus, from inner side; *d*, left ditto, from above and behind; *e*, portion of right palpus, from outer side.

10. *Erigone taczanowskii* ♂ & ♀, p. 444.

a, profile (♂); *b*, fore part of caput and falces (♂); *c*, left palpus (♂), from outer side in front; *d*, ditto, from inner side rather behind and above; *e*, epigyne (♀), from above; *f*, natural length, female; *g*, ditto, male.

11. *Erigone wagæ* ♂, p. 446.

a, profile; *b*, fore part of caput and falces; *c*, right palpus, from the front; *d*, portion of left ditto, from outer side; *e*, natural length of Spider.

12. *Erigone karpinskii* ♂ & ♀, p. 447.

a, profile (♂); *b*, fore part of caput and falces (♂); *c*, right palpus, from the front (♂); *d*, left ditto, from outer side; *e*, epigyne (♀), from above; *f*, natural length.

Fig. 13. *Erigone dybowskii* ♂, p. 449.

a, profile; *b*, Spider from above, without legs; *c*, cephalothorax; *d*, ditto, from the front; *e*, *f*, palpi, in two positions; *g*, natural length of Spider.

14. *Erigone subrostrata* ♂, p. 450.

a, profile; *b*, cephalothorax, from the front; *c*, *d*, palpi, in two positions; *e*, natural length of Spider.

2. On three new Species of Land-Shells from Madagascar. By G. B. Sowerby, jun.

[Received March 18, 1873.]

1. Cyclosioma (Tropidophora) suffusum, sp. nov.

Testa globoso-turbinata, obtecte umbilicata, rufo cærulescente suffusa, versus apicem aurantiaca, plus minusve obscure purpureo fasciata; anfractibus undique spiraliter striatis, ultimo circa umbilicum lirato; apertura oblique circulari; fauce rufo-pruinosa; labro expanso, sanguineo; operculo calcareo, plano.

A *Cyclostoma* of ordinary type, belonging to the section *Tropidophora*, Trosc., with rounded whorls, without keels, throughout regularly spirally striated, with an expanded red lip and plum-coloured interior, yellowish towards the apex; whorls more or less obscurely banded with purple, and the body-whorl suffused with red, which increases in intensity towards the mouth.

2. Cyclostoma vexillum, sp. nov.

Testa ovato-turrita, angustissime umbilicata, tenui, flavescente, atro lineata et unifasciata; anfractibus convexis, lævibus vel concentrice minutissime striatis; apertura circulari, labro tenuiter expanso; operculo calcareo, plano.

A pretty little species, of simple characters, elevated spire, very small umbilicus, thin substance, and yellowish colour, with a black band on the lower part of the whorls, from one to three narrow linear bands above and two round the umbilicus.

3. Cyclostoma (Tropidophora) perspectivum, sp. nov.

Testa depresso-turbinata, patentissime umbilicata, pallide rufo-fusca; spira depressiuscula; anfractibus anguste rotundatis, superne spiraliter obtuse liratis, concentrice decussate striatis, medio obsolete striatis, latissime unicarinatis, ultimo circa umbilicum valide lirato; apice plumbeo; apertura subcirculari; labro rufo-brunneo, late expanso reflexo, superne producto; operculo calcareo, plano.

A very widely umbilicated species, with a broad keel, of a uniform light reddish-brown colour; upper part of the whorls decussated, strongly corded round the umbilicus; lip deep reddish-brown, expanded and reflected, produced at the upper part.

This species is of the same type as *C. unicarinatum*, Lamarck, but is quite distinct, being more depressed, and having a much larger umbilicus and more expanded keel.

3. Notes on the Range of several American *Limicolæ*.

By P. L. Sclater, M.A., Ph.D., F.R.S., and Osbert Salvin, M.A.

[Received March 22, 1873.]

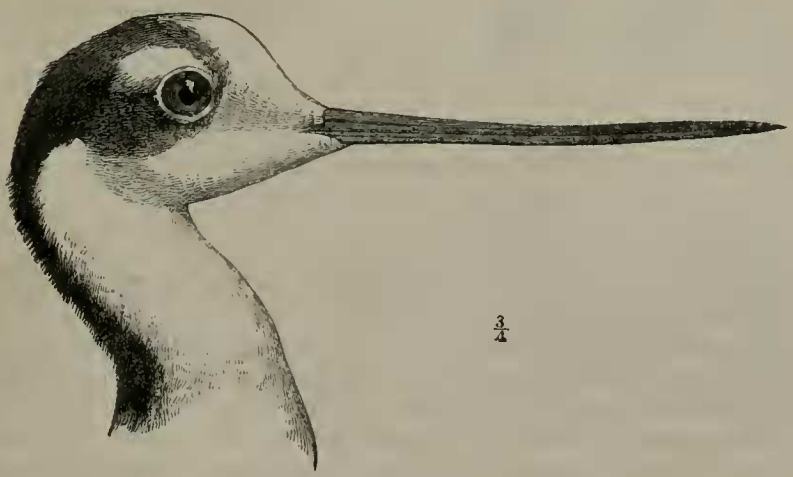
1. Himantopus.

An examination of the specimens of American Stilts in the collection of Salvin and Godman has convinced us that two species have hitherto been confounded under the name *Himantopus nigricollis*.

The northern bird, which must retain Vieillot's name, extends from the United States southwards as far as Brazil. Its southern representative, found in South Brazil, the Argentine Republic, and Chili, is easily known by having the whole top of the head white, and a broad white band across the upper back just below the neck. It must bear the name *brasiliensis* of Brehm, who has shortly described this species in his 'Vögel Deutschlands,' the previously given term *melanurus* of Vieillot, based on Azara, if really intended for this bird, involving an error in fact.

The synonymy of the two species will stand as follows:—

Fig. 1.



Head of *Himantopus nigricollis*.

1. Himantopus nigricollis.

Himantopus nigricollis, Vieill. N. D. x. p. 41, Enc. Méth.

p. 340, et Gall. Ois. ii. p. 85, pl. 229 ; Cassin, in Baird's B. N. A. p. 704 ; Sallé, P. Z. S. 1857, p. 237 ; Scl. P. Z. S. 1857, p. 206, 1864, p. 178 ; Scl. et Salv. P. Z. S. 1870, p. 323, et Ibis, 1859, p. 228 ; Newton, Ibis, 1859, p. 258.

Hypsibates nigricollis, Cab. in Schomb. Guian. iii. p. 758.

Recurvirostra himantopus, Wilson, Am. Orn. vii. p. 52.

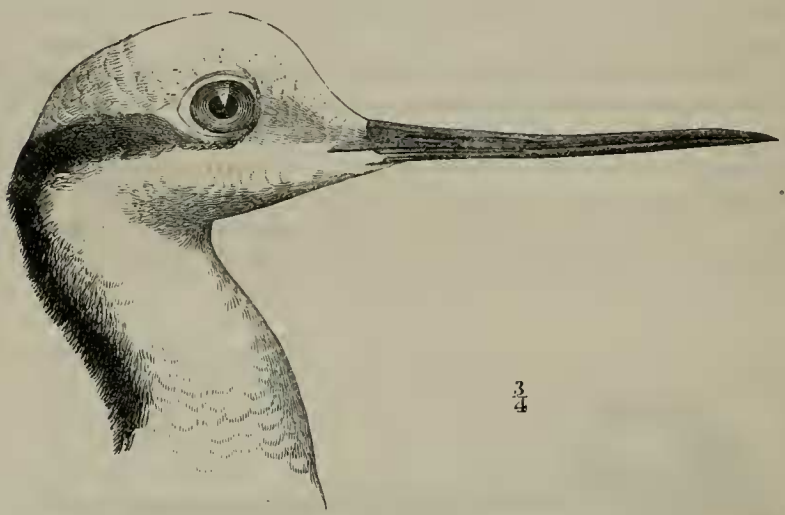
Himantopus mexicanus, Ord ; Wils. Orn. (1824) vii. p. 52 ; Max. Beitr. iv. p. 741 ; Burm. Syst. Ueb. iii. p. 367 ; Wagler, Isis, 1831, p. 520.

Diagn. *Pileo toto pone oculos nigro : macula supra oculos et oculorum ambitu angusto albis : dorso summo nigro.*

Hab. Whole of America down to Brazil.

Of this species we have before us examples from California, Guatemala (*Salvin*), Columbia (*Wyatt*), and the Galapagos (*Habel*). In the Society's Gardens is a living example lately received from Maranham, Brazil.

Fig. 2.



$\frac{3}{4}$

Head of *Himantopus brasiliensis*.

2. HIMANTOPUS BRASILIENSIS.

Zancudo, Azara, Apunt. iii. p. 297 (?).

Himantopus melanurus, Vieill. N. D. x. p. 42, et E. M. p. 340 (?).

H. mexicanus, Hartl. Ind. Az. p. 25.

H. nigricollis, Gay, Faun. Chil. *Aves* ; Cassin, in Gilliss's Exp. ii. p. 1 ; Burm. La-Plata Reise, ii. p. 502 ; Sclater, P. Z. S. 1867, p. 339 ; Scl. et Salv. P. Z. S. 1868, p. 144.

H. brasiliensis, Brehm, Vög. Deutschl. p. 684.

Diagn. *Pileo toto supero et fascia lata dorsum summum transeunte albis.*

Hab. South Brazil, Argentine Republic, and Chili.

Of this bird we have specimens before us from Caicara in Mattogrosso (*Natterer*), Buenos Ayres (*Hudson*), and Chili (*Leybold*).

Except in its rather larger size and in the differences above described, this species is very like the preceding.

2. Macrorhamphus.

If the American writers are correct, as we believe they are, in distinguishing two species of this genus, it would appear that both occur in the Neotropical region.

The Guatemalan specimens obtained by Mr. Salvin, and hitherto referred by him to *M. griseus* *, appear to belong to the longer-billed and longer-legged species, *M. scolopaceus*. Mr. Lawrence gives the same species as occurring in Costa Rica (Ann. L. N. Y. ix. p. 141).

But further south only *M. griseus* seems to be met with. Mr. Lawrence gives this species in his Panama list (Ann. L. N. Y. vii. p. 479); and one of Natterer's Brazilian skins (collected at Praia de Cajutaba, near Para) seems certainly referable to the shorter-legged *M. griseus*, as Hr. v. Pelzeln has correctly determined it (Orn. Bras. p. 313). This specimen, we may add, is far advanced in breeding-plumage.

Mr. Salvin's Guatemalan skins of *M. scolopaceus* were all obtained in winter, and are either in winter plumage or only just on the change.

3. Tringa.

Four of the species of *Tringa* recognized by the ornithologists of the United States extend far into the Neotropical region. In Salvin and Godman's collection are the following specimens of these species:—

1. Tringa maculata, Vieill.; Cassin, in Baird's B. N. A. p. 720.

Of this species we have before us skins from Guatemala (*Salvin*), Panama (*M'Cleannan*), Peru (*Whitely*), South Brazil (*Rogers*), and Chili (*Reed*).

2. Tringa bairdi, Coues.

Of this bird, besides typical northern specimens, we have skins from Mexico, Ecuador (*Fraser*), Eastern Peru (*Bartlett*), Western Peru (*Whitely*), and Chili (*Leybold*).

As stated (P. Z. S. 1868, p. 144), we have likewise examined skins of this species obtained by Mr. Hudson near Buenos Ayres; and we suppose it to be the *Tringa dorsalis* of Lichtenstein, first described by Burmeister (System. Ueb. iii. p. 374), and very possibly the *Chorlito lomo negro* of Azara, in which case *Tringa melanotus* of Vieillot is the first name for it. But both Azara's and Burmeister's measurements are too large for it.

3. Tringa bonapartii.

Of the *Tringa bonapartii* of Schlegel we have before us skins from Panama (*M'Cleannan*), Ypanema, South Brazil (*Natterer*),

* Ibis, 1860, p. 277, et 1865, p. 191.

Buenos Ayres (*Hudson*), and the Falklands (*Lecomte*). As already suggested (P. Z. S. 1868, p. 144), we think the name *fuscicollis* of Vieillot ought to be used for this species, it being, in our opinion, manifestly the bird called by Azara "*Chorlito pestorejo pardo*."

4. Tringa minutilla (Vieill.).

Of the specimens of this species in Salvin and Godman's collection, a list has recently been published in Sharpe and Dresser's 'Birds of Europe' (pts. xi. & xii.). It extends throughout Central and Southern America, at least as far south as South Brazil.

These four are the only true *Tringæ* of which we have seen specimens from any part of the Neotropical region. Cabanis (in Schomburgk's 'Guiana'), Pr. Max, and Burmeister all include the Knot (*Tringa canutus*) as occurring on the eastern coast of South America; but we have never met with examples of this bird from any locality so far south.

4. Limosa.

The only Godwit in South America is *L. hudsonica*, which descends down to the Magellan Straits and Falklands *. *Limosa australis*, G. R. Gray (Mus. Brit. Cat. of Gall. &c. 1844, p. 95), is founded on a specimen of this species in winter plumage.

Limosa fedoa (the second North-American species) also occurs in Guatemala † and on the coast of Honduras ‡; but we are not aware that it goes further south.

5. Numenius.

We have as yet met with only two species of Curlew in South America, both referable to northern species, namely *Numenius hudsonicus* and *N. borealis*.

N. hudsonicus extends all over Central and Southern America. Our specimens are from Guatemala, Amazonia, and Chili. It is called *N. phæopus* by Cabanis (Schomb. Guian. iii. p. 757) and v. Pelzeln (Orn. Bras. p. 308), and *N. brasiliensis* by Pr. Max. and Burmeister.

N. borealis (as Prof. Schlegel has already shown, Mus. d. P.-B. *Scolopaces*, p. 101) also extends into Southern Brazil, where it is the *N. brevirostris* of Lichtenstein, Temminck, and v. Pelzeln. The same species has recently been obtained in Southern Peru and Chili, and is well described by Philippi and Landbeck (Wiegm. Arch. 1866, p. 129) as *N. microrhynchus*.

The third Curlew of North America (*N. longirostris*), so far as we know, only extends as far south as Guatemala.

Of the Neotropical Limicolæ generally it may be said that *Gal-*

* Sclater, P. Z. S. 1860, p. 387.
† Salvin, Ibis, 1865, p. 190.
‡ Leyland, P. Z. S. 1859, p. 64.

linago is the only genus which produces peculiar *intertropical* species. All the other generic forms met with in the tropics of the New World are represented (as in the case of *Tringa*, *Numenius*, *Ægialites*) by arctic species descending south. Antarctic America, however, has some indigenous generic forms, such as *Oreophilus*, *Phegornis*, and *Pluvianellus*, and a few peculiar species of genera of wide distribution.

4. On the Carotid Arteries of Birds.

By A. H. Garrod, B.A., F.Z.S., Prosector to the Society.

[Received April 10, 1873.]

Between the years 1825 and 1830 three anatomists published the results of their independent observations respecting the number of and the variations in the carotid arteries of the different members of the class Aves. The first of these was Bauer*, who, in 1825, pointed out some of the most noteworthy peculiarities, which have been subsequently verified. Meckel†, in 1826, was enabled to demonstrate the existence of other marked variations; and his observations, extending over a considerable period, are incorporated in his 'Comparative Anatomy.' In 1829, C. L. Nitzsch selected the same subject for a disquisition before the University of Halle‡. Since that time scarcely any further additions have been made, and the subject has been almost entirely neglected. It is not easy to understand the reason of this; for it is generally acknowledged that what has been already done by the above-named authors is extremely valuable as an assistance towards a knowledge of the correct classification of birds, and yet they have left much for other workers in the same field. The opportunities afforded me by this Society, as their Prosector, and by many kind friends, who have supplied me with specimens, in spirit, of genera and species otherwise unobtainable, have enabled me to collect together a sufficient number of facts previously unrecorded, to make me feel justified in presenting to this Society a fresh list, in which is recorded the arrangement of the carotids of the various birds examined by myself, at the same time that the previously known results of Bauer, Meckel, and Nitzsch, and a few others, are incorporated in the general statements.

In birds, the aorta, immediately after it has sprung from the heart, divides, as stated by Meckel, and contrary to the opinion of Cuvier, into two branches, the left innominate and the continuation of the main trunk. This latter again almost immediately divides into the right innominate and the descending aortic arch. Each innominate, after sending off pectoral and subclavian branches, continues to ascend a short way; and when near the superior aperture

* Disquis. circa nonnullarum Avium systema arteriosum (Berol. 1825).
† "Beitrag zur Geschichte des Gefäss-Syst. der Vögel," Meckel's Archiv, 1826.
‡ Observationes de Avium arteria carotide communi (Halæ, 1829).

of the thorax it divides into the carotid, vertebral, and thyroid branches, except in those in which the carotid of one side is deficient. In what may be called the typical arrangement, the carotids, equal in size or nearly so, run up the front of the neck from the inner side

Fig. 1*.

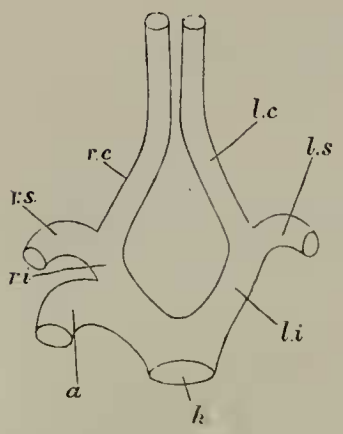


Fig. 2.

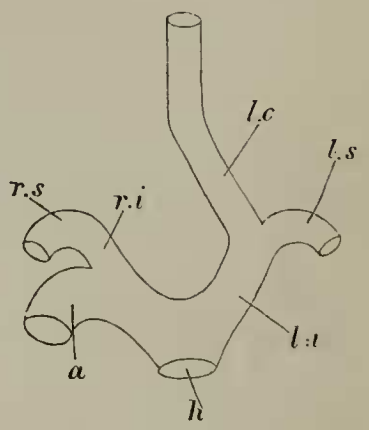


Fig. 1. Carotids at the base of the neck in *aves bicarotidinæ normales*.
Fig. 2. Carotids at the base of the neck in *aves lævo-carotidinæ*.

of each thyroid gland, converging until they meet in the middle line, at which spot they enter the median intermuscular septum, and continue up to the head, on the front of the bodies of the remaining cervical vertebræ, in the hypapophysial canal, covered by the lateral cervical muscular masses, and, where they are present, threading the bony arches. Birds with this arrangement are said to have two carotids, and may be termed *aves bicarotidinæ normales* (see fig. 1).

A second group is peculiar in having the right carotid branch of the innominate undeveloped, when the left only traverses the hypapophysial canal, being of large size; it bifurcates shortly before it reaches the head, thus producing a vessel on each side, to be distributed in the same way as the terminations of the carotids in the previous group. Such birds are said to have a left carotid, and may be termed *aves lævo-carotidinæ* (see fig. 2).

In a third arrangement, found only in certain Parrots (see fig. 3), the right carotid artery runs in the hypapophysial canal, and the left at the side of the neck superficially along with the corresponding

* In these diagrams, which represent the main arteries at the root of the neck, the following is the explanation of the abbreviations:—*h*, origin of the aorta at the heart; *a*. arch of the aorta; *l.i*, left innominate artery; *r.i*, right innominate artery; *l.s*, left subclavian, and *r.s*, right subclavian artery; *l.c*, left carotid, and *r.c*, right carotid artery.

pneumogastric nerve and jugular vein. Birds with this arrangement may be termed *aves bicarotidinæ abnormales* (see fig. 3.)

Fig. 3.

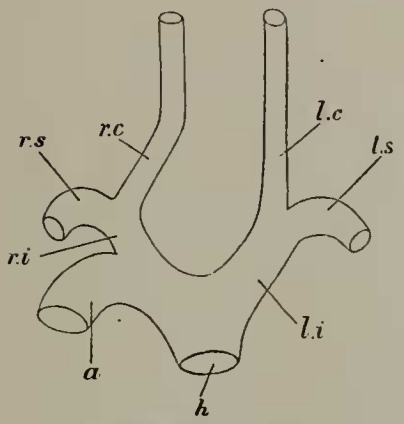


Fig. 4.

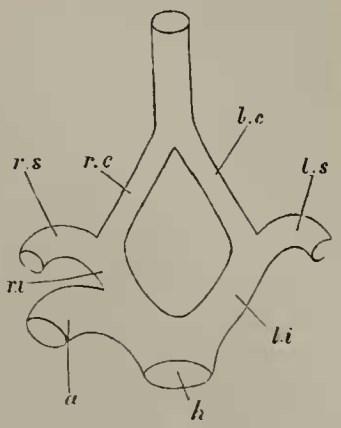


Fig. 3. Carotids at the base of the neck in *aves bicarotidinæ abnormales*.
Fig. 4. Carotids at the base of the neck in *aves conjuncto-carotidinæ*.

Fourthly, the two carotids, running apparently as usual, directly they meet, join and continue as a single trunk till near the head, where the single vessel bifurcates, as in birds with a left carotid only. These

Fig. 5.

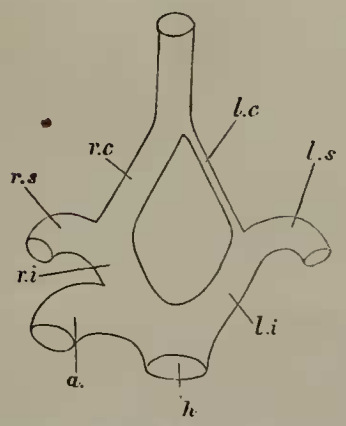


Fig. 6.

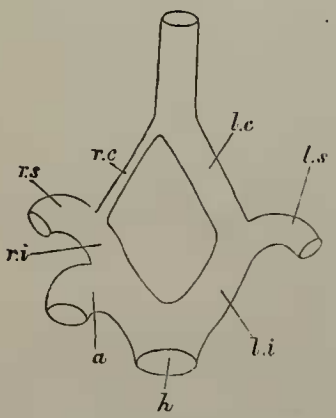


Fig. 5. Carotids at the base of the neck in the genus *Phœnicopterus*, as found by myself in all specimens.
Fig. 6. Carotids at the base of the neck in *Cacatua sulphurea*, according to Meckel.

may be termed *aves conjuncto-carotidinæ*. In the common Bittern, where this condition obtains, the arteries (fig. 4) are equal in size or very nearly so; but in the Flamingo (fig. 5) the left is extremely small, and has been on this account overlooked by previous observers,

Meckel, Nitzsch, and Owen stating that there is only a right carotid in *Phœnicopterus*. I have had the opportunity of examining two specimens of *Phœnicopterus antiquorum* and two of *P. ruber*; and in all of them both carotids were present in the lower part of the neck, the right being much the larger and being joined by the left to form one trunk at the point in the neck where they first meet, as in *Botaurus stellaris*. Both vessels carried blood; but the calibre of the left was extremely small, and that of the right was nearly the same as it would have been if it alone had been present.

From the list at the end of this paper it is shown that of 300 genera in which the arrangement of the carotids has been observed, in 193 of them both are present, in 107 the left only; in one only are both equal when they join in the neck; in another they join, the left being the smaller; and in one other the right is the smaller under similar conditions; whilst perhaps one possesses the right only. So it may be generally stated that in birds either both carotids are present separate, or the left only exists. Several attempts have been made by different authors to account for these peculiarities. According to Bauer, the simplicity of the carotids (in other words, the presence of the left instead of two) is dependent on the size of the individual, the smaller species having the single trunk. Undoubtedly the great majority conform to this rule; but there are too many exceptions, as shown by Meckel, to make the generalization of much value, *Rhea*, *Podiceps*, *Cacatua*, *Talegalla*, and *Menura* possessing only the left. Meckel originally thought that a correlation existed between the length of the neck and the simplicity of the carotids; but when he found two carotids in *Struthio*, *Dromœus*, *Cygnus*, and *Ardea* he acknowledged that such was not the case. Prof. Owen remarks*, "Birds as a rule are peculiar in sleeping with their long necks much bent or twisted; and this position might be expected to exercise some effect on the vessels subject thereto. Accordingly we find that the carotids are frequently of unequal size; in the Dabchick† the left is the largest; in an Emu I found it the smallest." I may here remark that on several occasions I have watched the Flamingos sleeping; and they do so, some with the neck bent one way and some the other, in a manner quite independent of the constant peculiarity in the arteries of their necks.

All these explanations, therefore, fail to show why birds should have two or only one carotid artery; and it is the last of them only that takes into consideration which carotid would be absent when there is any deficiency. If it were proved that all birds with a left carotid slept with their necks bent in one direction, the only explanation would be, that they did so because the arrangement of their cervical vessels would not allow of their doing otherwise, and consequently an argument in a circle would be the only result. The ultimate cause is most probably as yet some way beyond our grasp; but I would offer

* Anatomy of Vertebrata, vol. ii. p. 190.

† In the Grebes (*Podiceps*), according to my observations, the right carotid is not found to be present at all. A. H. G.

the following as a step towards it. In birds possessing two carotids those vessels, after they have once met, run close together in the hypapophysial canal, but do not blend or anastomose in any way.

In *Botaurus stellaris*, *Cacatua sulphurea* (according to Meckel, as shown in the diagram, fig. 6, p. 459), and the genus *Phœnicopterus*, the carotids join to become one vessel at the spot where, in others, they come into contact, each proximal portion persisting. What I desire to show is, that on simple mechanical principles it is much more likely, when the two vessels do so blend, that the right should disappear, leaving the left solely to maintain the cerebral and cervical circulation; in other words, the assumption that there is a blending of the left with the right carotid in early life is sufficient to explain the absence of the right in birds thus affected. The diagram fig. 4, p. 459 (which shows the distribution of the arteries at the base of the neck as they would appear immediately after the fusion of the carotids), will help to explain my meaning. The blood-current, almost immediately it has passed the aortic valve, divides into two, one going along the left innominate, and the other following the course of the aorta until it very shortly further divides into that traversing the right innominate, and that which continues on to the abdomen and posterior extremities. Such being the case, and the two carotids being of equal calibre, it is evident that, just as in Wheatstone's Bridge the electric current is less intense in the bridge itself than in the branches, the current in the right carotid, which, in the case under consideration, connects the left carotid with the aorta distad of the point at which the left innominate springs, is less than in the vessels it connects; consequently the current there tends to stagnate; but a tendency to stagnate in blood is a tendency to coagulation, as is seen in the proximal end of a ligatured arterial trunk; and the tendency to coagulation is a tendency to obliteration of the vessel in which the coagulation occurs; consequently the right carotid must tend to disappear, which it does in nearly every case. Since this explanation occurred to me, I have not had the opportunity of examining any of the birds in which the right artery persists after it has fused with the left, to see if there is any peculiarity in their vascular arrangement which will account for its persistence. When the carotids do not blend there is evidently no reason why either should disappear; and when they do join, the presence of a large pectoral and subclavian branch from each innominate does not alter the problem; it only indicates that the obliteration must occur distad of it, as is the case.

The following list includes all those species of birds in which I have had the opportunity of observing the disposition of the carotid arteries. They are arranged nearly according to the classification adopted in Mr. Sclater's revised List of the Vertebrated Animals in the Gardens of this Society.

PASSERES.

All the Passeres examined possess the left carotid only.

Species examined.

Oscines.

a. Oscines dentirostres.

Turdus merula.
—— *grayi.*
Sylvia hippolais.
Luscinia vera.
Erithacus rubecula.
Pratincola rubetra.
Ruticilla phœnicura.
Myiadestes obscurus.
Sialia wilsonii.
Troglodytes parvulus.
Mniotilta varia.
Cinclus aquaticus.
Motacilla flava.
Anthus pratensis.
Parus major.
Sitta europæa.
Lanius collurio.
Sigmodus caniceps.
Struthidea cinerea.
Oriolus, sp.
Artamus, sp.
Graucalus macei
Dicrurus leucops.
Muscicapa grisola.
Ptilogonys cinereus.
Ampelis garrulus.

b. Oscines latirostres.

Hirundo rustica.
Chelidon urbica.

c. Oscines tenuirostres.

Nectarinia, sp.
Zosterops albogularis.
Dicæum, sp.
Anthornis melanura.
Posthemadera novæ-zealandiæ.
Tropidorhynchus, sp.
Diglossa baritula.
Cœreba cyanea.

d. Oscines conirostres.

Tanagra cana.
Euphonia violacea.
Cissopis leveriana.
Estrelda melpoda.
Quelea occidentalis.
Euplectes capensis.
Ploceus manyar.
Hyphantornis castaneo-fuscus.
Padda oryzivora.
Munia major.
Poëphila cincla.
Donacola castaneothorax.
Cyanospiza ciris.
Cardinalis virginianus.
Coccothraustes vulgaris.
Hedymeles ludoviciana.
Pyrrhula vulgaris.
Corythus enucleator.
Linaria cannabina.
Emberiza, sp.
Alauda arvensis.
Melanocorypha calandra.

e. Oscines cultrirostres.

Icterus abeillæi.
Molothrus bonariensis.
Cassicus persicus.
Agelæus ludovicianus.
Sturnus vulgaris.
Gracula religiosa.
Ptilonorhynchus holosericeus.
Heteralocha gouldi.
Corvus corax.
—— *frugilegus.*
—— *australis.*
Garrulus glandarius.

Cyanocorax cyanopogon. *Strepera graculina.*
Cissa speciosa.

TRACHEOPHONÆ.

Pitta, sp. *Pitangus sulphuratus.*
Rupicola crocea. *Hylactes megapodius.*
Lipaugus cineraceus. *Menura superba.*
Tyrannus satrapa.

MACROCHIRES.

TROCHILIDÆ.

The left carotid only is present in

Patagona gigas. *Chlorolampis osberti.*

CYPSELIDÆ.

The left carotid only is present in the following species:—

Cypselus apus. *Chetura spinicauda.*
—— *alpinus.* —— *caudacuta.*
Chetura vauxi. *Dendrochelidon coronata.*

But both carotids were found to be present in a specimen of

Cypseloides fumigatus.

CAPRIMULGIDÆ.

Both carotids are present in these birds.

Species examined.

Caprimulgus europæus. *Chordeiles texensis.*

STEATORNITHIDÆ.

Both carotids are present in

Steatornis caripensis.

PICI.

PICIDÆ.

The left carotid only is present in the Woodpeckers.

Species examined.

Picus major. *Chloronerpes yucatanensis.*
—— *minor.* *Melanerpes formicivorus.*
Picoides tridactylus. *Mulleripicus fulvus.*
Tiga javensis. *Gecinus viridis.*
Leuconerpes candidus. *Yunx torquilla.*

COCCYGES.

CORACIADÆ.

Both carotids are found in these birds.

Species examined.

Coracias garrula. *Eurystomus*, sp.

TROGONIDÆ.

The left carotid only is present in these birds.

Species examined.

Trogon mexicanus. *Trogon puella.*

MEROPIDÆ.

The left carotid only is present in these birds.

Species examined.

Merops apiaster. *Merops ornatus.*

MOMOTIDÆ.

Both carotids are present in these birds.

Species examined.

Momotus lessoni. *Eumomota superciliaris.*

GALBULIDÆ.

Both carotids are present in these birds.

Species examined.

Galbula albirostris. *Urogalba paradisea.*

ALCEDINIDÆ.

Both carotids are present in these birds.

Species examined.

Alcedo ispida.
Halcyon, sp.
Dacelo gigantea.
Dacelo cervina.
Ceryle amazona.
—— *maxima.*
Cittura cyanotis.

BUCEROTIDÆ.

Both carotids are present in these birds *.

Species examined.

Buceros rhinoceros.
—— *plicatus.*
—— *bicornis.*
Buceros coronatus.
—— *atratus.*

UPUPIDÆ.

The left carotid only is present in

Upupa epops.

MUSOPHAGIDÆ.

Both carotids are present in these birds.

Species examined.

Musophaga violacea.
Schizorhis africana.
Corythaix albocristata.

* PS., Sept. 4.—In a specimen of *Toccus melanoleucus* just dissected I find the left carotid only present.

Cuculidæ.

Both carotids are present in these birds.

Species examined.

Cuculus canorus.
Cacomantis sepulcralis.
Chrysococcyx, sp.
Centropus senegalensis.
Guira piririgua.
Phœnicophaes, sp.

Ramphastidæ.

The left carotid only is developed in these birds.

Species examined.

Ramphastos cuvieri.
—— *ariel.*
Ramphastos carinatus.

Capitonidæ.

The left carotid only is present in these birds.

Species examined.

Megalæma asiatica.
Barbatula duchaillui.
Indicator major.

PSITTACI.

The Parrots are peculiar for the variation that occurs in their carotids, which show four different arrangements: first, there may be two in the normal position; secondly, the right may, as it usually does, traverse the hypapophysial canal, whilst the left, in a manner quite exceptional, runs superficially along the side of the neck in company with the left pneumogastric nerve and the left jugular vein; thirdly, the right may be very small, and blend with the much larger normally situated left (in *Cacatua sulphurea*, according to Meckel); and, fourthly, the left may alone be developed, as in the Passeres. The first of these four conditions is only found in Old-World Parrots; and the last two are restricted to the Cacatuinæ.

Species examined.

In the following species the first plan prevails, the two carotids running normally:—

Stringops habroptilus.
Calopsitta novæ-hollandiæ.
Eolophus (Cacatua) roseicapillus.
Euphema pulchella.
—— *splendida.*
—— *bourkii.*
Melopsittacus undulatus.
Agapornis roseicollis.
Prioniturus, sp.
Lorius cardinalis.
Eos indica.
Trichoglossus concinnus.
Loriculus, sp.
Aprosmictus scapulatus.
Palæornis alexandri.

The following species belong to the second division, the right carotid running normally, whilst the left runs up the side of the neck, together with the left pneumogastric nerve and jugular vein:—

Ara macao.
Conurus cruentatus.
Conurus xantholæmus.
—— *jendaya.*

Conurus petzi.
—— *holochlorus.*
Caïca melanocephala.
Psittacus erithacus.
Nestor notabilis.
—— *hypopolius.*
Brotogerys tiriacula.
—— *virescens.*
—— *tui.*
Pionus menstruus.
Chrysotis festiva.
—— *ochrocephala.*
—— *levaillantii.*
Psephotus hæmatogaster.
Cyanorhamphus auriceps.
—— *novæ zealandiæ.*
Platycercus eximius.
—— *pallidiceps.*
Psittacula passerina.
Lathamus discolor.

In the following species, forming the fourth section, the left carotid only is developed:—

Cacatua galerita. *Cacatua cristata.*

I have not yet had an opportunity of examining the third condition, *i. e.* that said to occur in *Cacatua sulphurea.*

ACCIPITRES.

Both carotids are present in all these birds.

Species examined.

CATHARTIDÆ.

Cathartes atratus.
Gyparchus papa.

VULTURIDÆ.

Neophron percnopterus.
Gyps fulvus.

SERPENTARIIDÆ.

Serpentarius reptilivorus.

FALCONIDÆ.

Polyborus brasiliensis.
Milvus ictinus.
Buteo vulgaris.
Archibuteo lagopus.
Helotarsus ecaudatus.
Haliaëtus albicilla.
—— *vocifer.*
Aquila nævioïdes.
—— *audax.*
Spilornis cheela.
Thrasaëtus harpyia.
Falco peregrinus.
—— *melanogenys.*
Hypotriorchis subbuteo.
Tinnunculus alaudarius.
Melierax monogrammicus.
Astur palumbarius.
Circus cineraceus.

STRIGIDÆ.

Both carotids are present in these birds.

Species examined.

Strix flammea.
Otus vulgaris.
Syrnium aluco.
—— *nebulosum.*
Bubo maximus.
—— *virginianus.*
—— *bengalensis.*
—— *capensis.*
—— *poensis.*
—— *fasciolatus.*
Ketupa javanensis.
Scops zorca.
Athene noctua.
—— *passerina.*
—— *brama.*
Pholeoptynx cunicularia.
Glaucidium, sp.
Pulsatrix torquata.
Surnia funerea.

STEGANOPODES.

Both carotids are present in these birds.

Species examined.

Fregata aquilus.
Sula bassana.
Phalacrocorax carbo.
Phaëthon, sp.

HERODIONES.

Ardeidæ.

Both carotids are present in the following species :—

Ardea cinerea.
—— *goliath.*
—— *purpurea.*
—— *alba.*
Ardea egretta.
—— *garzetta.*
—— *candidissima.*
Nycticorax europæus.

But the two carotids join at the lower part of the neck directly they meet in

Botaurus stellaris.

Ciconiidæ.

Both carotids are present in these birds.

Species examined.

Ciconia nigra.
—— *alba.*
Leptoptilus crumeniferus.

Plataleidæ.

Both carotids are present in these birds.

Species examined.

Ibis rubra.
—— *melanocephala.*
—— *strictipennis.*
Ibis nippon.
Platalea leucorodia.

Phœnicopteridæ.

The right carotid is much larger than the left, which joins it low down in the neck.

Phœnicopterus antiquorum.
Phœnicopterus ruber.

ANSERES.

Both carotids are present in all these birds.

Species examined.

Anser segetum.
Bernicla canadensis.
Chloëphaga, sp.
Cygnus nigricollis.
—— *buccinator.*
—— *coscoroba.*
Dendrocygna autumnalis.
—— *viduata.*
—— *fulva.*
Tadorna rutila.
Aix galericulata.
Mareca penelope.
Dafila spinicauda.
Querquedula crecca.
Metopiana peposaca.
Fuligula cristata.
Mergus castor.
—— *albellus.*

COLUMBÆ.

Both carotids are present in all these birds.

Species examined.

CARPOPHAGIDÆ.

Carpophaga globicera.
—— *ænea.*
Lopholæmus antarcticus.
Ptilonopus melanocephalus.
—— *mariæ.*
Treron calva.

COLUMBIDÆ.

Columba ænas.
—— *livia.*
—— *leucocephala.*
—— *picazuro.*
—— *maculosa.*
—— *vinacea.*
Geopelia striata.
—— *placida.*
—— *cuneata.*
Geopelia humeralis.
Turtur senegalensis.
—— *aldabranus.*
Metriopelia melanoptera.
Chamæpelia talpacoti.
Leptoptila jamaicensis.
Chalcopelia chalcospilos.
—— *puella.*
Tympanistria bicolor.
Ocyphaps lophotes.
Chalcophaps chrysochlora.
Phaps chalcoptera.
Phlogœnas cruentata.
Calœnas nicobarica.
Didunculus strigirostris.
Goura coronata.
—— *victoriæ.*

GALLINÆ.

Both carotids are present in all this Order, except in the Turnicidæ and Megapodidæ, in which the left only is developed.

Species examined.

With both carotids.

PTEROCLIDÆ.

Pterocles alchata.
—— *arenarius.*

TETRAONIDÆ.

Tetrao tetrix.
—— *urogallus.*

PHASIANIDÆ.

Francolinus vulgaris.
—— *afer.*
—— *ponticerianus.*
—— *gularis.*
—— *clappertoni.*
Arboricola torqueola.
Perdix cinerea.
Coturnix communis.
Rollulus coronatus.
Odontophorus dentatus.
Ortyx virginianus.
Eupsychortyx cristatus.
Caccabis chukar.
Phasianus colchicus.
Phasianus versicolor.
—— *reevesii.*
Thaumalia picta.
—— *amherstiæ.*
Euplocamus erythrophthalmus.
—— *vieilloti.*
—— *pyronotus.*
—— *horsfieldii.*
—— *albo-cristatus.*
Gallus bankiva.
Ceriornis temminckii.
Pavo nigripennis.
—— *muticus.*
Argus giganteus.
Meleagris gallopavo.
Numida meleagris.

CRACIDÆ.

Crax globicera.
—— *incommoda.*
Penelope cristatus.
Ortalida albiventris.